

November 20, 2002

Mr. Michael M. Corletti
AP600 & AP1000 Projects
Westinghouse Electric Company
P.O. Box 355
Pittsburgh, Pennsylvania 15230-0355

SUBJECT: AP1000 DESIGN CERTIFICATION REVIEW - REQUEST FOR ADDITIONAL
INFORMATION NO. 720.098 (TAC NO. MB5491)

Dear Mr. Corletti:

The U.S. Nuclear Regulatory Commission (NRC) staff is reviewing your design certification request for the AP1000 standard plant design. Included in the staff's effort is the review of the severe accident management design alternatives. As part of its efforts in this area, the staff plans to use the MELCOR code to perform baseline analyses for risk significant sequences for the AP1000. The results will be used to develop input for the staff's safety evaluation report.

The staff has reviewed your response to RAI 720.001 dated September 10, 2002, and requires additional information to support performing the MELCOR analyses. Please see the enclosed RAI 720.098. The staff provided a copy of this RAI to you via electronic mail on October 23, 2002. You agreed that Westinghouse will submit a response to this RAI by December 9, 2002. Receipt of this information by that date will support the schedule given in our letter of July 12, 2002.

If you have any questions regarding this matter, I can be reached at 301-415-3053.

Sincerely,

/RA/

Lawrence J. Burkhart, AP1000 Project Manager
New Reactor Licensing Project Office
Office of Nuclear Reactor Regulation

Docket No. 52-006

Enclosure: As stated

cc w/encl: See next page

November 20, 2002

Mr. Michael M. Corletti
AP600 & AP1000 Projects
Westinghouse Electric Company
P.O. Box 355
Pittsburgh, Pennsylvania 15230-0355

SUBJECT: AP1000 DESIGN CERTIFICATION REVIEW - REQUEST FOR ADDITIONAL
INFORMATION NO. 720.098 (TAC NO. MB5491)

Dear Mr. Corletti:

The U.S. Nuclear Regulatory Commission (NRC) staff is reviewing your design certification request for the AP1000 standard plant design. Included in the staff's effort is the review of the severe accident management design alternatives. As part of its efforts in this area, the staff plans to use the MELCOR code to perform baseline analyses for risk significant sequences for the AP1000. The results will be used to develop input for the staff's safety evaluation report.

The staff has reviewed your response to RAI 720.001 dated September 10, 2002, and requires additional information to support performing the MELCOR analyses. Please see the enclosed RAI 720.098. The staff provided a copy of this RAI to you via electronic mail on October 23, 2002. You agreed that Westinghouse will submit a response to this RAI by December 9, 2002. Receipt of this information by that date will support the schedule given in our letter of July 12, 2002.

If you have any questions regarding this matter, I can be reached at 301-415-3053.

Sincerely,

/RA/

Lawrence J. Burkhart, AP1000 Project Manager
New Reactor Licensing Project Office
Office of Nuclear Reactor Regulation

Docket No. 52-006

Enclosure: As stated

cc w/encl: See next page

ACCESSION NUMBER: ML023090219-Response
ACCESSION NUMBER: ML023090243-Enclosure
ACCESSION NUMBER: ML023090241-Pkg. *See previous concurrence

OFFICE	NRLPO/PM*	SPSB/BC*	NRLPO/DD
NAME	LBurkhart:cn	MJohnson	MGamberoni
DATE	11/6/02	11/8/02	11/14/02

OFFICIAL RECORD COPY

Distribution for Letter to M. M. Corletti dated November 20, 2002

Hard Copy

NRLPO R/F
LBurkhart
JLyons
MGamberoni
ADrozd

E-mail

PUBLIC
S. Collins
J. Johnson
B. Sheron
R. Borchardt
D. Matthews
F. Gillespie
J. Wilson
G. Holahan
S. Black
J. Moore, OGC
M. El-Zeftawy, ACRS
T. King, RES
A. Thadani, RES
J. Shea, EDO
B. Henderson, OPA
M. Johnson
M. Rubin
R. Palla
A. Drozd
A. Behbahani
J. Rosenthal
R. Lee
S. Basu
CDoutt

Request for Additional Information (RAI)
AP1000 Design Certification Review
RAI 720.098

720.098

A. Additional Design Parameter Values

Please provide values for the following AP1000 parameters needed to complete the MELCOR input deck (this list includes parameters that were not part of the response to RAI 720.001 dated September 10, 2002).

1. The dimensions of the portion of the reactor cavity that is directly below the reactor vessel,
2. The perimeter and radial dimensions of the core shroud (preferably including a detailed radial diagram of the shroud with measurements identified),
3. If the channel head of the steam generator (SG) consists of both a cylindrical part and hemispherical part, please provide the inner diameter, height, and thickness of the cylindrical part and the inner diameter and thickness of the hemispherical part. If the channel head of the SG is a hemispherical part, only the thickness of the channel head is required,
4. The thickness of the lower and upper portions of the SG shell,
5. The thickness of the SG tube wrapper,
6. Inner and outer diameters of the guide tubes in the upper plenum region of the reactor vessel (in the region above the upper core support plate and below the upper support plate),
7. Inner and outer diameters of the instrument tubes in the upper plenum region of the reactor vessel,
8. Inner and outer diameters of the guide tubes in the dome region of the reactor vessel,
9. Inner and outer diameters of the instrument tubes in the dome region of the reactor vessel,
10. The fluid volume of a reactor coolant pump (RCP), excluding the suction and discharge piping volumes,
11. The height of the fluid volume of the RCP,
12. The wall thickness of the containment chimney,
13. The diameter of sparger tubes in the in-containment refueling water storage tank (IRWST),
14. The thickness of the containment air baffle,
15. The thickness and tube thickness of the burnable absorber rods,
16. Mass of the top and bottom Nr-Cr-Fe alloy 718 grid spacers,
17. Number and diameter (or area) of penetrations in the lower core support plate,
18. Number, material, mass, surface area, height, and elevation of steam separators in the SGs,
19. Number, material, mass, surface area, height, and elevation of dryers in the SGs,
20. The correct free-volume versus altitude table for the secondary side of the SGs (there is a discrepancy in the MAAP input in this regard - see Section B),
21. Setpoint value for "Low-2 Hot Leg Level" signal,
22. Nominal volume of water in the cask loading pit,
23. Length and inner diameter of passive residual heat removal (PRHR) inlet line, and
24. Nominal volume of condensate available for feed water systems.

Enclosure

- B. A number of apparent inconsistencies in the AP1000 design control document (DCD) and/or MAAP input deck have been found. The most important of these with respect to the process of MELCOR modeling are documented in Table 1. Please address these discrepancies and provide the correct values for the parameters in question. Make DCD changes as necessary.

Table 1

No.	Parameter	DCD	MAAP (parameter designation in the provided input deck)
1	The height of the core from the top of the lower core support plate to the bottom of the upper core support plate	4.7843 meters (m) (See Figure 1)	4.858 m (See Figure 1)
2	Number of tubes per SG	10025 (Table 5.4-4)	1000 (NTSG)
3	Water volume in the SG inlet and outlet plena per SG	16.6503 cubic meters (m ³) Table 5.4-5	20.2 (VSGPHD) - 2.96.9 (see Figure 2) = 17.24 m ³
4	Primary water volume in the SG tubes only	42.1638 m ³ (Table 5.4-5)	61.3 (VSGPR1) - 20.2 (VSGPHD) = 41.1 m ³
5	The cross-sectional flow area for secondary side of the SG inside of the shroud (the tube bundle wrapper) (Note: This data is incorrect because AFLWSG + the cross-sectional area for the tube bundle is larger than the total area inside wrapper)	Not provided	9.54 square meters (m ²) (AFLWSG)

6	The lowest elevations for various containment distributed heat sinks (Note: These elevation data in MAAP input deck are not correct because they are outside of the ranges of their respective control volumes)	Not provided	<p>7.5784 m (ZHSRB for HS#4)</p> <p>17.4284 m (ZHSRB for HS#5)</p> <p>15.3084 m (ZHSRB for HS#6)</p> <p>8.1584 m (ZHSRB for HS#10)</p> <p>13.6484 m (ZHSRB for HS#11)</p> <p>9.8584 m (ZHSRB for HS#12)</p> <p>6.1684 m (ZHSRB for HS#13)</p> <p>21.4284 m (ZHSRB for HS#14)</p> <p>12.4584 m (ZHSRB for HS#15)</p> <p>18.4184 m (ZHSRB for HS#16)</p> <p>18.4184 m (ZHSRB for HS#17)</p> <p>13.8384 m (ZHSRB for HS#18)</p> <p>8.1784 m (ZHSRB for HS#21)</p> <p>21.4284 m (ZHSRB for HS#24)</p> <p>17.186 m (ZHSRB for HS#25)</p> <p>8.6793 m (ZHSRB for HS#39)</p> <p>8.6793 m (ZHSRB for HS#42)</p> <p>8.6793 m (ZHSRB for HS#45)</p>
7	High-3 Pressurizer Level is defined as 15.55 m from the bottom of the pressurizer (this must be incorrect because this is larger than the total height of the pressurizer).	Not provided	15.55 m (ZWPZH)

C. MAAP Results

Please provide any MAAP results for the AP1000 that are available (e.g., in the form of a list of key event timing and graphs of key variables) for dominant severe accident sequences (e.g., any of the sequences listed in Table 33-4 of the AP1000 probabilistic risk assessment).

AP 1000

cc:

Mr. W. Edward Cummins
AP600 and AP1000 Projects
Westinghouse Electric Company
P.O. Box 355
Pittsburgh, PA 15230-0355

Mr. H. A. Sepp
Westinghouse Electric Company
P.O. Box 355
Pittsburgh, PA 15230

Lynn Connor
Doc-Search Associates
2211 SW 1ST Ave - #1502
Portland, OR 97201

Barton Z. Cowan, Esq.
Eckert Seamans Cherin & Mellott, LLC
600 Grant Street 44th Floor
Pittsburgh, PA 15219

Mr. Ed Rodwell, Manager
Advanced Nuclear Plants' Systems
Electric Power Research Institute
3412 Hillview Avenue
Palo Alto, CA 94304-1395

Charles Brinkman, Director
Washington Operations
Westinghouse Electric Company
12300 Twinbrook Parkway, Suite 330
Rockville, MD 20852

Mr. R. Simard
Nuclear Energy Institute
1776 I Street NW
Suite 400
Washington, DC 20006

Mr. Thomas P. Miller
U.S. Department of Energy
Headquarters - Germantown
19901 Germantown Road
Germantown, MD 20874-1290

Mr. David Lochbaum
Nuclear Safety Engineer
Union of Concerned Scientists
1707 H Street NW, Suite 600
Washington, DC 20006-3919

Mr. Paul Gunter
Nuclear Information & Resource Service
1424 16th Street, NW., Suite 404
Washington, DC 20036

Mr. Tom Clements
6703 Guide Avenue
Takoma Park, MD 20912

Mr. James Riccio
Greenpeace
702 H Street, NW, Suite 300
Washington, DC 20001

Mr. James F. Mallay, Director
Regulatory Affairs
FRAMATOME, ANP
3315 Old Forest Road
Lynchburg, VA 24501

Mr. Ed Wallace, General Manager
Project Management
Lake Buena Vista Bldg., 3rd Floor
1267 Gordon Hood Avenue
Centurion 0046
Republic of South Africa
PO Box 9396 Centurion 0046

Mr. Vince Langman
Licensing Manager
Atomic Energy of Canada Limited
2251 Speakman Drive
Mississauga, Ontario
Canada L5K 1B2

Mr. Gary Wright, Manager
Office of Nuclear Facility Safety
Illinois Department of Nuclear Safety
1035 Outer Park Drive
Springfield, IL 62704

Dr. Gail H. Marcus
U.S. Department of Energy
Room 5A-143
1000 Independence Ave., SW
Washington, DC 20585

Mr. Edwin Lyman
Nuclear Control Institute
1000 Connecticut Avenue, NW
Suite 410
Washington, DC 20036

Mr. Jack W. Roe
SCIENTECH, INC.
910 Clopper Road
Gaithersburg, MD 20878

Patricia Campbell
Winston & Strawn
1400 L Street, NW
Washington, DC 20005

Mr. David Ritter
Research Associate on Nuclear Energy
Public Citizens Critical Mass Energy
and Environmental Program
215 Pennsylvania Avenue, SE
Washington, DC 20003